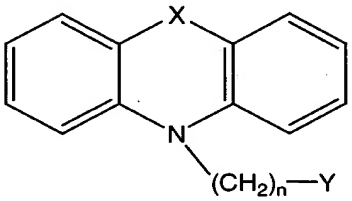
Claims

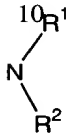
1. A compound having the structural formula



or a pharmaceutically acceptable salt or prodrug thereof, wherein X is a substituted or unsubstituted alkyl or a heteroatom;

n is 4, 5 or 6;

Y is a substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, or



wherein R_1 and R_2 are each independently, H, a heteroatom, substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl; and

wherein each ring structure are independently substituted or unsubstituted.

2. The compound of claim 1, wherein X is C, S, or ethyl.

3. The compound of claim 1, wherein Y is pyrrolidinyl, piperidinyl, morpholinyl, or 4-methylpiperazinyl.

4. The compound of claim 1, wherein R_1 and R_2 are each independently, methyl, ethyl, or benzyl.

5. The compound of claim 1, wherein the compound modulates, attenuates, reverses, affects, or a combination thereof, a cell's or organism's resistance to a given drug or compound.

6. The compound of claim 5, wherein the given drug or compound is an antimalarial.

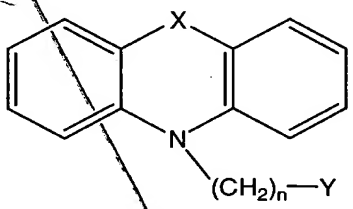
7. The compound of claim 1, wherein the compound is:
10-(4-Dimethylaminobutyl)phenothiazine,
10-(4-Diethylaminobutyl)phenothiazine,
10-(4-Methylbenzylaminobutyl)phenothiazine,
10-(4-Dibenzylaminobutyl)phenothiazine,
10-(4-Pyrrolidin-1-yl-butyl)phenothiazine,
10-(4-Piperidin-1-yl-butyl)phenothiazine,
10-(4-Morpholin-4-yl-butyl)phenothiazine,
10-[4-(4-Methyl-piperazin-1-yl)-butyl]phenothiazine,
5-(4-Dimethylaminobutyl)iminodibenzyl,
5-(4-Diethylaminobutyl)iminodibenzyl,
5-(4-Methylbenzylaminobutyl)iminodibenzyl,
5-(4-Dibenzylaminobutyl)iminodibenzyl,
5-(4-Pyrrolidin-1-yl-butyl)iminodibenzyl,
5-(4-Piperidin-1-yl-butyl) iminodibenzyl,
5-(4-Morpholin-4-yl-butyl)iminodibenzyl,
5-[4-(4-Methyl-piperazin-1-yl)-butyl]iminodibenzyl,
5-(4-Diethylaminobutyl)iminostilbene,
5-(4-Pyrrolidin-1-yl-butyl)iminostilbene,
N,N-Diethyl-N',N'-diphenyl-butane-1,4-diamine,
Diphenyl-(4-pyrrolidin-1-yl-butyl)amine,
5-(5-Diethylaminopentyl)iminodibenzyl,
5-(5-Pyrrolidin-1-yl-pentyl)iminodibenzyl,
5-(6-Diethylaminohexyl)iminodibenzyl, or
5-(6-Pyrrolidin-1-yl-hexyl)iminodibenzyl.

8. The compound of claim 1, wherein the compound is:
5-(4-Piperidin-1-yl-butyl) iminodibenzyl,
5-(4-Morpholin-4-yl-butyl)iminodibenzyl, or
5-[4-(4-Methyl-piperazin-1-yl)-butyl]iminodibenzyl.

9. The compound of claim 1, wherein the compound is not:
10-(4-Dimethylaminobutyl)phenothiazine,
10-(4-Diethylaminobutyl)phenothiazine,
10-(4-Methylbenzylaminobutyl)phenothiazine,

10-(4-Dibenzylaminobutyl)phenothiazine,
10-(4-Pyrrolidin-1-yl-butyl)phenothiazine,
10-(4-Piperidin-1-yl-butyl)phenothiazine,
10-(4-Morpholin-4-yl-butyl)phenothiazine,
10-[4-(4-Methyl-piperazin-1-yl)-butyl]phenothiazine,
5-(4-Dimethylaminobutyl)iminodibenzyl,
5-(4-Diethylaminobutyl)iminodibenzyl,
5-(4-Methylbenzylaminobutyl)iminodibenzyl,
5-(4-Dibenzylaminobutyl)iminodibenzyl,
5-(4-Pyrrolidin-1-yl-butyl)iminodibenzyl,
5-(4-Diethylaminobutyl)iminostilbene,
5-(4-Pyrrolidin-1-yl-butyl)iminostilbene,
N,N-Diethyl-N',N'-diphenyl-butane-1,4-diamine,
Diphenyl-(4-pyrrolidin-1-yl-butyl)amine,
5-(5-Diethylaminopentyl)iminodibenzyl,
5-(5-Pyrrolidin-1-yl-pentyl)iminodibenzyl,
5-(6-Diethylaminohexyl)iminodibenzyl, or
5-(6-Pyrrolidin-1-yl-hexyl)iminodibenzyl.

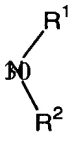
10. A pharmaceutical composition comprising a compound having the structural formula



or a pharmaceutically acceptable salt or prodrug thereof, wherein X is a substituted or unsubstituted alkyl or a heteroatom;

n is 4, 5 or 6;

Y is a substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, or



wherein R_1 and R_2 are each independently, H, a heteroatom, substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl;

wherein each ring structure are independently substituted or unsubstituted; and

a pharmaceutically acceptable excipient.

11. The pharmaceutical composition of claim 10, wherein X is C, S, or ethyl.

12. The pharmaceutical composition of claim 10, wherein Y is pyrrolidinyl, piperidinyl, morpholinyl, or 4-methylpiperazinyl.

13. The pharmaceutical composition of claim 10, wherein R_1 and R_2 are each independently, methyl, ethyl, or benzyl.

14. The pharmaceutical composition of claim 10, wherein the compound is
10-(4-Dimethylaminobutyl)phenothiazine,
10-(4-Diethylaminobutyl)phenothiazine,
10-(4-Methylbenzylaminobutyl)phenothiazine,
10-(4-Dibenzylaminobutyl)phenothiazine,
10-(4-Pyrrolidin-1-yl-butyl)phenothiazine,
10-(4-Piperidin-1-yl-butyl)phenothiazine,
10-(4-Morpholin-4-yl-butyl)phenothiazine,
10-[4-(4-Methyl-piperazin-1-yl)-butyl]phenothiazine,
5-(4-Dimethylaminobutyl)iminodibenzyl,
5-(4-Diethylaminobutyl)iminodibenzyl,
5-(4-Methylbenzylaminobutyl)iminodibenzyl,
5-(4-Dibenzylaminobutyl)iminodibenzyl,
5-(4-Pyrrolidin-1-yl-butyl)iminodibenzyl,
5-(4-Piperidin-1-yl-butyl) iminodibenzyl,
5-(4-Morpholin-4-yl-butyl)iminodibenzyl,
5-[4-(4-Methyl-piperazin-1-yl)-butyl]iminodibenzyl,
5-(4-Diethylaminobutyl)iminostilbene,
5-(4-Pyrrolidin-1-yl-butyl)iminostilbene,
N,N-Diethyl-N',N'-diphenyl-butane-1,4-diamine,
Diphenyl-(4-pyrrolidin-1-yl-butyl)amine,
5-(5-Diethylaminopentyl)iminodibenzyl,
5-(5-Pyrrolidin-1-yl-pentyl)iminodibenzyl,
5-(6-Diethylaminohexyl)iminodibenzyl,
5-(6-Pyrrolidin-1-yl-hexyl)iminodibenzyl, or a pharmaceutically acceptable salt or prodrug thereof.

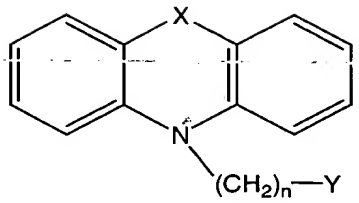
15. The pharmaceutical composition of claim 10, wherein the compound is

5-(4-Piperidin-1-yl-butyl) iminodibenzyl,
5-(4-Morpholin-4-yl-butyl)iminodibenzyl,
5-[4-(4-Methyl-piperazin-1-yl)-butyl]iminodibenzyl, or a pharmaceutically acceptable salt or prodrug thereof.

16. The pharmaceutical composition of claim 10, wherein the compound is not
10-(4-Dimethylaminobutyl)phenothiazine,
10-(4-Diethylaminobutyl)phenothiazine,
10-(4-Methylbenzylaminobutyl)phenothiazine,
10-(4-Dibenzylaminobutyl)phenothiazine,
10-(4-Pyrrolidin-1-yl-butyl)phenothiazine,
10-(4-Piperidin-1-yl-butyl)phenothiazine,
10-(4-Morpholin-4-yl-butyl)phenothiazine,
10-[4-(4-Methyl-piperazin-1-yl)-butyl]phenothiazine,
5-(4-Dimethylaminobutyl)iminodibenzyl,
5-(4-Diethylaminobutyl)iminodibenzyl,
5-(4-Methylbenzylaminobutyl)iminodibenzyl,
5-(4-Dibenzylaminobutyl)iminodibenzyl,
5-(4-Pyrrolidin-1-yl-butyl)iminodibenzyl,
5-(4-Diethylaminobutyl)iminostilbene,
5-(4-Pyrrolidin-1-yl-butyl)iminostilbene,
N,N-Diethyl-N',N'-diphenyl-butane-1,4-diamine,
Diphenyl-(4-pyrrolidin-1-yl-butyl)amine,
5-(5-Diethylaminopentyl)iminodibenzyl,
5-(5-Pyrrolidin-1-yl-pentyl)iminodibenzyl,
5-(6-Diethylaminohexyl)iminodibenzyl, or
5-(6-Pyrrolidin-1-yl-hexyl)iminodibenzyl.

17. The pharmaceutical composition of claim 10, further comprising a supplementary active compound.

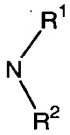
18. The pharmaceutical composition of claim 17, wherein the supplementary active compound is the given drug or compound or a second compound having the structural formula



or a pharmaceutically acceptable salt or prodrug thereof, wherein X is a substituted or unsubstituted alkyl or a heteroatom;

n is 4, 5 or 6; and

Y is a substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, or

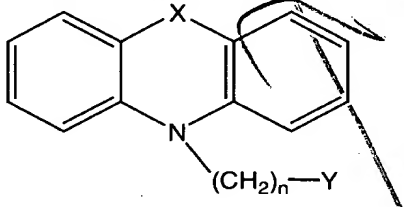


wherein R_1 and R_2 are each independently, H, a heteroatom, substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl; and

wherein each ring structure are independently substituted or unsubstituted.

19. The pharmaceutical composition of claim 17, wherein the supplementary active compound is an antimalarial.

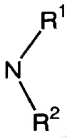
20. A chemosensitizing agent comprising a compound having the structural formula



or a pharmaceutically acceptable salt or prodrug thereof, wherein X is a substituted or unsubstituted alkyl or a heteroatom;

n is 4, 5 or 6;

Y is a substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, or



wherein R_1 and R_2 are each independently, H, a heteroatom, substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl; and

wherein each ring structure are independently substituted or unsubstituted.

21. The chemosensitizing agent of claim 20, wherein the fractional inhibitory concentration is less than 0.6.

22. The chemosensitizing agent of claim 20, wherein the fractional inhibitory concentration is less than 0.5.

23. The chemosensitizing agent of claim 20, wherein the fractional inhibitory concentration is less than 0.4.

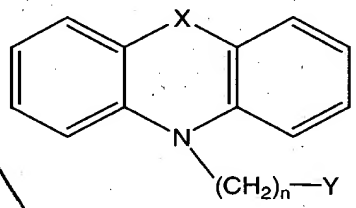
24. The chemosensitizing agent of claim 20, wherein the fractional inhibitory concentration is less than 0.3.

25. The chemosensitizing agent of claim 20, wherein the fractional inhibitory concentration is about 0.2.

26. The chemosensitizing agent of claim 20, wherein the compound modulates, attenuates, reverses, or affects a cell's or organism's resistance to a given drug or compound.

27. The chemosensitizing agent of claim 26, wherein the given drug or compound is an antimalarial.

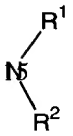
28. A method of modulating, attenuating, reversing, affecting, or a combination thereof, a cell's or organism's resistance to a given drug comprising administering a compound having the structural formula



or a pharmaceutically acceptable salt or prodrug thereof, wherein X is a substituted or unsubstituted alkyl or a heteroatom;

n is 4, 5 or 6;

Y is a substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, or

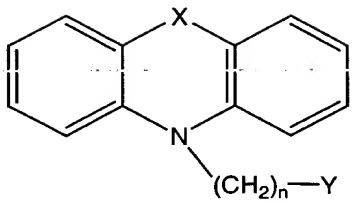


wherein R_1 and R_2 are each independently, H, a heteroatom, substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl; and

wherein each ring structure are independently substituted or unsubstituted.

29. The method of claim 28, wherein the given drug or compound is an antimalarial.

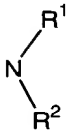
30. A method of treating, preventing, or inhibiting malaria in a subject comprising administering to the subject a therapeutically effective amount of a compound having the structural formula



or a pharmaceutically acceptable salt or prodrug thereof, wherein X is a substituted or unsubstituted alkyl or a heteroatom;

n is 4, 5 or 6;

Y is a substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, heteroaryl, or



wherein R_1 and R_2 are each independently, H, a heteroatom, substituted or unsubstituted alkyl, cycloalkyl, heterocycloalkyl, aryl, or heteroaryl; and

wherein each ring structure are independently substituted or unsubstituted.

31. The method of claim 30, further comprising administering an antimalarial.